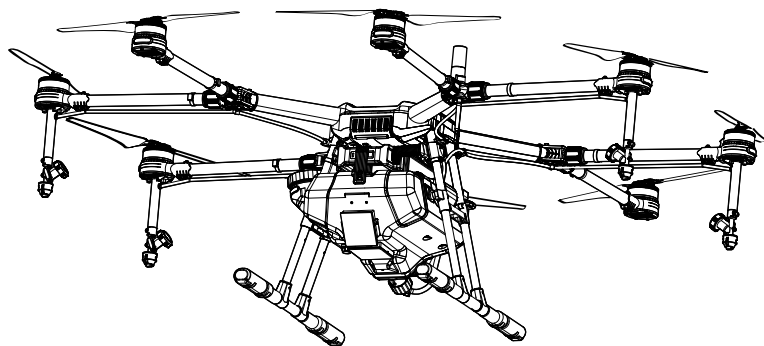


# AGRAS MG-1S

MG-1S / MG-1S RTK

User Manual V1.0

2017.10



### **Searching for Keywords**

Search for keywords such as “battery” and “install” to find a topic. If you are using Adobe Acrobat Reader to read this document, press Ctrl+F on Windows or Command+F on Mac to begin a search.

### **Navigating to a Topic**

View a complete list of topics in the table of contents. Click on a topic to navigate to that section.

### **Printing this Document**

This document supports high resolution printing.

## Information

The AGRAS™ MG-1S / Agras MG-1S RTK does not come with a battery. Please purchase the DJI™ Designated Battery (Model: MG-12000S). Read the battery's safety guidelines and take necessary precautions when handling to ensure your own safety. DJI assumes no liability for damage(s) or injuries incurred directly or indirectly from misusing batteries.

## Using This Manual

### Legend

 Important

 Hints and tips

 Reference

### Before Flight

The following manuals have been produced to help you get the most out of your Agras MG-1S / Agras MG-1S RTK:

1. In the Box
2. Disclaimer and Safety Guidelines
3. Quick Start Guide
4. User Manual

Refer to In the Box to check the listed parts, and read the Disclaimer and Safety Guidelines before flight. Refer to the Quick Start Guide and the video tutorial on the official DJI website to complete assembly and to learn basic operation. Please refer to the User Manual for more comprehensive information.

### Watch the Tutorial Video

Please watch the tutorial video below to learn how to install and use the Agras MG-1S / Agras MG-1S RTK correctly:  
<http://www.dji.com/mg-1s/info#video>



### Download DJI Assistant 2

Download DJI ASSISTANT™ 2 from:  
<http://www.dji.com/mg-1s/info#downloads>



# Safety at a Glance

## 1. Pesticide Usage

- Pesticides are poisonous and pose serious risks to human safety. Please use them in strict accordance with their specifications.
- Residue on the equipment caused by splashes or spills when pouring and mixing the pesticide can irritate your skin. Be sure to clean the equipment after mixing.
- Use clean water to mix the pesticide to avoid blocking the strainer. Clear any blockages before using the equipment.
- Wear protective clothing to prevent direct body contact with the pesticide. Always rinse your hands and skin after handling pesticides. Clean the aircraft and remote controller after applying the pesticide.
- Effective use of pesticides relies on pesticide density, spray rate, spray distance, aircraft speed, wind speed and wind direction. Consider all factors when using pesticides, but NEVER compromise the safety of people, animals and the environment in doing so.
- DO NOT contaminate rivers and sources of drinking water.
- Avoid the use of powder pesticides as much as possible or else they may reduce the service life of the spraying system.



The AGRAS MG-1S / Agras MG-1S RTK (abbreviated as "MG-1S" / "MG-1S RTK") aircraft is NOT a toy and is not suitable for children under the age of 18.

Note that 'Safety at a Glance' only provides a quick overview of the safety tips. Make sure you read and understand the remaining sections of this document and the User Manual.

## 2. Environmental Considerations

- Always fly at locations that are clear of building and other obstacles.
- DO NOT fly above or near large crowds.
- Avoid flying at altitudes above 164 feet (50 m).
- Be very careful when flying over 6,560 feet (2,000 m) above sea level.
- Fly in moderate weather conditions with temperatures between 32° to 104° F (0° to 40° C).
- DO NOT operate any parts of the aircraft indoors.

## 3. Pre-flight Checklist

- Remote controller and aircraft batteries are fully charged.
- Landing gear and spray tank are firmly in place.
- All screws are firmly tightened.
- Propellers and frame arms are unfolded, and arm sleeves are firmly tightened.
- Propellers are in good condition and firmly tightened.
- There is nothing obstructing the motors.
- Spraying system is without any blockage and works properly.
- Compass is calibrated at every new flight location.

## 4. Operation

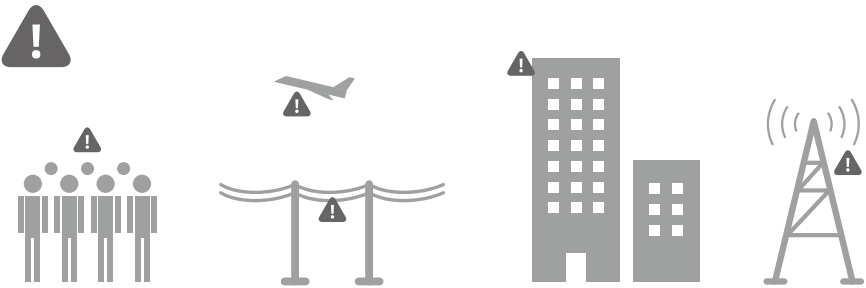
- Stay away from the rotating propellers and motors.
- The takeoff weight must not exceed 24.8 kg (taking off at sea level).
- Maintain a visual line of sight (VLOS) to your aircraft at all times.
- DO NOT use the Combination Stick Command (CSC) or other methods to stop the motors when the aircraft is airborne unless in an emergency situation.
- DO NOT answer incoming calls during flight.
- DO NOT fly under the influence of alcohol or drugs.
- During the Return-to-Home procedure, you can adjust the altitude to avoid obstacles.
- In the instance of a Low Battery Warning, land the aircraft at a safe location.
- After landing, first stop the motors, then power off the aircraft, and then turn off the remote controller.
- Please maintain full control of the aircraft at all times and do not rely on the DJI MG app. Please keep the aircraft within your visual line of sight and visually observe the flight. Please use your sound discretion to operate the aircraft and avoid obstacles timely and manually. It is important to set an appropriate Failsafe and Return-to-Home altitude before each flight.

## 5. Maintenance and Upkeep

- DO NOT use aged, chipped or broken propellers.
- Remove or empty the spray tank during transportation or when not in use to avoid damaging the landing gear.
- Recommended storage temperature (empty spray tank): between -4° and 104° F (-20° and 40° C).
- Clean the aircraft immediately after spraying.
- Inspect the aircraft every 100 flights or after flying for over 20 hours.
- For more maintenance guidelines, refer to the Product Care section in this document.

## 6. Observe Local Laws and Regulations

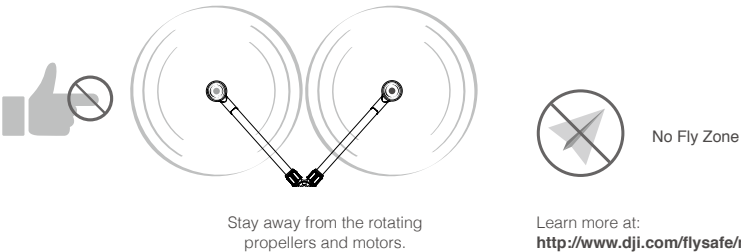
- DO NOT fly in any No Fly Zones. You can find a list of these areas at <http://www.dji.com/flysafe/no-fly>
- The DJI No Fly Zone is not a replacement for local government regulations or good judgment.
- Avoid flying in areas where rescue teams are actively using the airspace.



Avoid flying over or near crowds, high voltage power lines or bodies of water. Strong electromagnetic sources such as power lines, base stations, and tall buildings may affect the onboard compass. It is recommended to use MG-1S RTK. Always stay alert about surroundings in flight.



DO NOT use the aircraft in adverse weather conditions such as rain (precipitation rate exceeding 25 mm or 0.98 inches in 12 hours), wind speeds exceeding 8 m/s or 17 mph (28 kph), fog, snow, and lightning.



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# Profile

## Introduction

The Agras MG-1S / Agras MG-1S RTK (abbreviated as "MG-1S" / "MG-1S RTK") is a battery-powered multirotor aircraft designed for agricultural applications in variety of environments and terrains, including fields, forests and orchards. It is dust-proof, water-proof (IP43 protection rating, IEC standard 60529) and made of anti-corrosive materials, allowing it to be rinsed clean.

The MG-1S / MG-1S RTK contains DJI's dedicated A3 redundancy system with dual IMU and dual compass capabilities, ensuring safe and stable operation at all times. The MG-1S RTK has a built-in DJI Onboard D-RTK\*, which provides more accurate data for centimeter-level positioning. F-mode, uses the DJI MG app for automatic intelligent flight planning. Radar Terrain Follow, consists of three radar modules, one on the front, rear, and underside of the aircraft, measuring distances from all three directions for terrain follow applications.

The remote controller is equipped with a bright, dedicated screen with a built-in Android system that runs the DJI MG app independently. The app features intelligent operation planning functions to produce flight routes automatically, according to marked operation areas and obstacles. The DJI MG app is able to display the system status, convenient when your aircraft is spraying far away from you.

## Feature Highlights

The MG-1S uses a DJI dedicated flight control system, providing three operation modes: Smart, Manual, and Manual Plus. This system also includes three flight modes: P-mode (Positioning), A-mode (Attitude), and F-mode (Function).

In Smart operation mode, the aircraft will travel along a pre-planned route and spray its liquid payload. Users can set the line spacing, flying speed, and other parameters. The MG-1S can cover an area of 7-10 acres per hour.

In Manual operation mode, users can start and stop spraying manually and also adjust the spray rate.

In Manual Plus operation mode, flight speed is restricted and heading is locked. Except for the heading, users can control the aircraft's movement via control sticks. Press button C1/C2 and the aircraft will fly one line spacing to the left/right.

The DJI MG app will automatically produce flight routes based on your planned tasks, which the aircraft will perform once in F-mode.

The MG-1S also includes two intelligent memory features: Operation Resumption and System Data Protection. When the operation or flight mode is changed from Smart operation mode or F-mode, Operation Resumption records a set return point for the aircraft when Smart Operation Mode is reinstated. System Data Protection keeps system data for 30 seconds, even when powered off, so users can resume their missions after replacing the battery.

The spraying system includes a spray tank, flow meter, liquid level meter, sprinklers, and other accessories. The four sprinklers placed on the aircraft's two sides provide evenly distributed spraying and coverage of the liquid payload. The nozzles on the MG-1S / MG-1S RTK can also be swapped out to meet the needs of different applications.

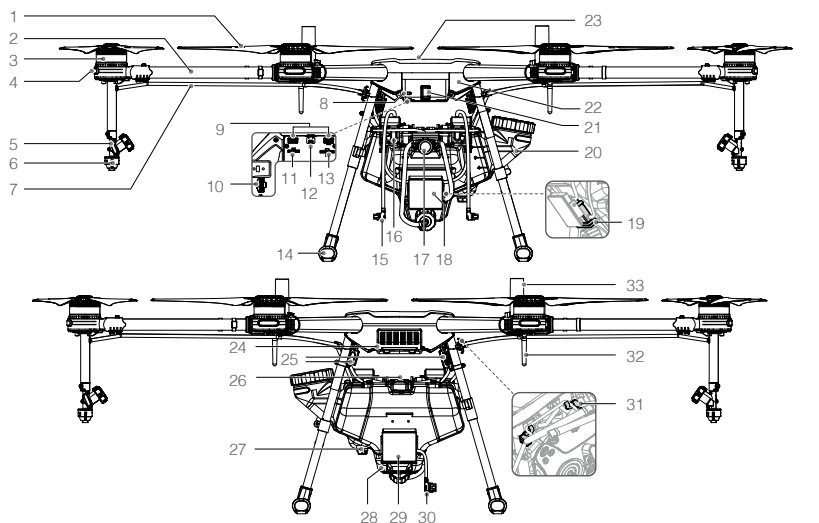
An advanced Radar Terrain Follow System consists of three radar modules located on the front, rear, and underside of the aircraft. It works automatically in Smart or Manual Plus operation mode or F-mode.

The MG-1S RTK has a built-in DJI Onboard D-RTK, providing more accurate data for centimeter-level positioning when used with the DJI D-RTK Base Station. An optional DJI D-RTK Handheld Mapper is designed for more precise field planning, enhancing agricultural operations with the Intelligent Operation Planning System within the DJI MG app.

\* This should be used with a DJI D-RTK™ Base Station (purchased additionally). Refer to [RTK Functions](#) (p. 41) for details.

## Overview

### Aircraft

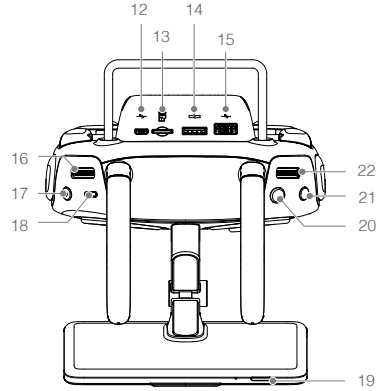
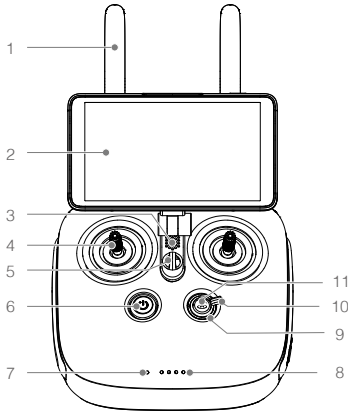


- |                              |   |  |
|------------------------------|---|--|
| 1 Propellers                 | 13 Reserved Expansion Port 2                        | 24 Intake Vent (front of the aircraft)         |
| 2 Frame Arms                 | 14 Landing Gear                                     | 25 Power Ports                                 |
| 3 Motors                     | 15 Pump Cables                                      | 26 Battery Compartment                         |
| 4 Orientation LEDs           | 16 Delivery Pumps                                   | 27 Liquid Level Meter                          |
| 5 Sprinklers                 | 17 Flow Meter                                       | 28 Downward Radar Module                       |
| 6 Nozzles                    | 18 Rear Radar Module                                | 29 Forward Radar Module                        |
| 7 Hoses                      | 19 Buffer Tank                                      | 30 Radar Cable                                 |
| 8 Link Button                | 20 Spray Tank                                       | 31 Remote Controller Holder                    |
| 9 Pump Ports                 | 21 Aircraft Status Indicator (rear of the aircraft) | 32 Datalink Pro Antennas                       |
| 10 Reserved Expansion Port 1 | 22 Aircraft Body                                    | 33 Onboard D-RTK Antennas (for MG-1S RTK only) |
| 11 Radar Port                | 23 Built-in GPS Module                              |  |
| 12 Micro USB Port            |   |  |



- DO NOT obstruct the GPS module located at the center of the aircraft, as this will reduce the GPS signal strength.
- The MG-1S / MG-1S RTK does not come with a battery. Please purchase the DJI approved MG-1S battery pack (Model: MG-12000S).

## Remote Controller



### 1 Antennas

Relays aircraft control signals.

### 2 Display Device

Android-based to run the DJI MG app.

### 3 Speaker

Audio output.

### 4 Control Sticks

Controls aircraft movement. Can be set to Mode 1, Mode 2, or a custom mode.

### 5 Lanyard Attachment

Used to attach the remote controller lanyard.

### 6 Power Button

Used to turn the remote controller on and off.

### 7 Status LED

Indicates whether the remote controller is linked to the aircraft.

### 8 Battery Level LEDs

Displays current battery level.

### 9 RTH Status LED

Circular LED around the RTH button. Displays RTH status.

### 10 Operation Mode Switch

Used to switch between Smart, Manual, and Manual Plus operation modes.

### 11 RTH Button

Press and hold this button to initiate Return to Home (RTH).

### 12 Micro USB Port

Reserved.

### 13 Micro SD Card Slot

Provides display device with up to 128 GB of extra storage.

### 14 CAN Port

Used to connect other accessories, such as a GPS module.

### 15 USB Port

Used for upcoming functions.

### 16 Spray Rate Dial

Turn to adjust the spray rate in both Manual and Manual Plus operation modes.

### 17 Spray Button

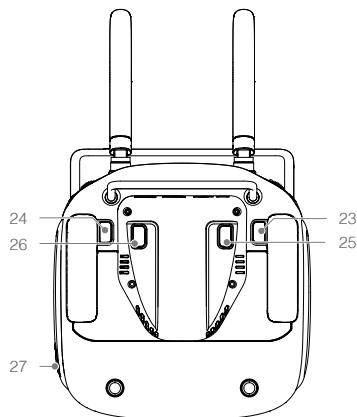
Press to start/stop spraying in Manual operation mode.

### 18 Flight Mode Switch

Used to switch among P, A, and M flight modes.

### 19 Sleep/Wake Button

Press to sleep/wake the screen; press and hold to restart.



- 20 Button A**  
Records Point A of the operation route.
- 21 Button B**  
Records Point B of the operation route.
- 22 Settings Dial**  
Turn to adjust work efficiency in Smart operation mode or F-mode.

- 23 Button C1**  
Press to choose operation route L in Smart operation mode. Press to fly the aircraft one line spacing to the left in Manual Plus operation mode. Press to start or end obstacle measurements when planning a task.

- 24 Button C2**  
Press to choose operation route R in Smart operation mode. Press to fly the aircraft one line spacing to the right in Manual Plus operation mode. Press to add a waypoint when planning a task.

- 25 Button C3**  
Press to use the front two sprinklers only in Manual operation mode. Press to add a calibration point when planning a task.

- 26 Button C4**  
Press to use only the rear two sprinklers in Manual operation mode.

- 27 Power Port**  
Connects to a power source to charge the remote controller's internal battery.

# Installation

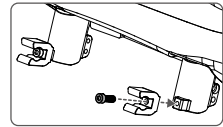


- Threadlocker is required for installation. Apply threadlocker when mounting the landing gear, spray tank, sprinklers and power port modules. Ensure threadlocker is totally dry and solid before flight.
- DO NOT bend the hose in an arc tighter than its minimum bend radius during installation. This is to avoid creasing, which may compromise the spraying effect.
- Ensure that all installation and connection procedures are completed before powering on the aircraft.

Installation steps are the same for both the MG-1S and MG-1S RTK. The illustrations below use the MG-1S as an example.

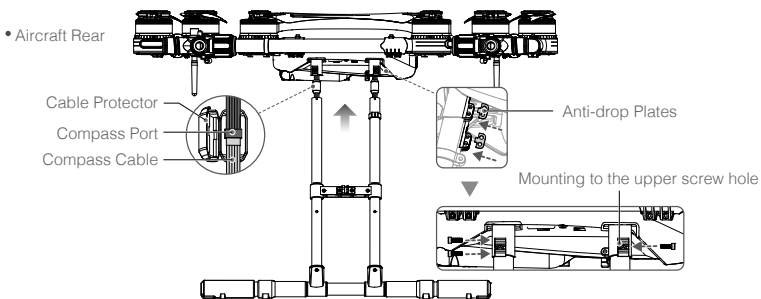
## Mounting the Hose Clip

Mount the self-adhesive hose clip to the outside of the right landing gear leg mounting position (as shown) and tighten the M3×6 screw.



## Mounting the Landing Gear

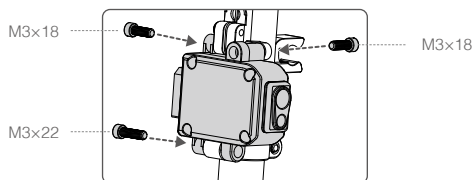
1. Identify the landing gear leg containing the two compass cables.
2. Take out each compass cable from the tube of the landing gear leg. Looking from the rear of the aircraft, connect each compass cable to the compass port on the right side of the aircraft body. Put the assembled cable into the cable protector slot and close it. Be careful not to damage the cable.
3. Place each cable protector and cable into its corresponding mounting position on the aircraft body then mount the right landing gear leg to the mounting position.
4. Insert the two anti-drop plates into the mounting position and tighten the three M3×10 screws.



5. Mount the left landing gear leg and tighten the three M3×10 screws.

## Mounting the Power Port Modules

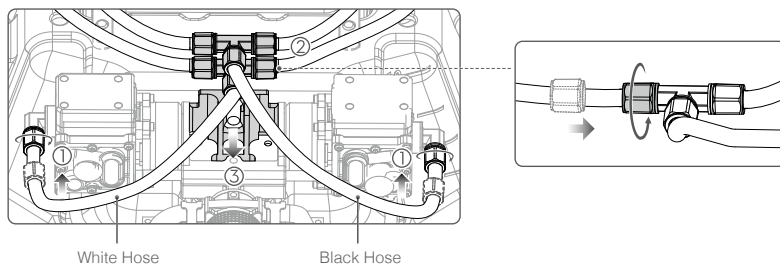
Mount the two power port modules on the bottom of the aircraft onto the two landing gear legs and tighten the two M3×18 screws and one M3×22 screw.



## Mounting the Spray Tank

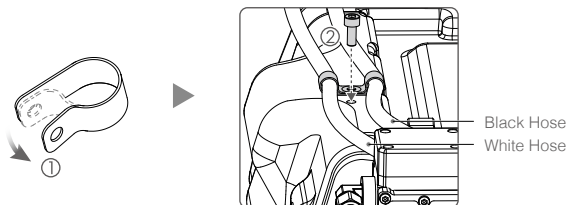
1. Connect the sprinkler kits to the spray tank.

- ① Remove the nuts on the left and right delivery pump outlets and pull the white hose on the T connector through the nut to the left outlet. Pull the black hose on the T connector through the nut to the right outlet, then tighten both nuts using an appropriate wrench. Be sure to securely tighten the nuts to avoid liquid leakage.
- ② Remove the nut on the T connector then pull the white (or black) hose with a sprinkler through the nut to the T connector with a white (or black) hose. Tighten the nut using an appropriate wrench.
- ③ Insert the two T connectors of the two sprinkler kits into the slots between the two delivery pumps. Note that the T connector with a white hose should be under the one with a black hose.

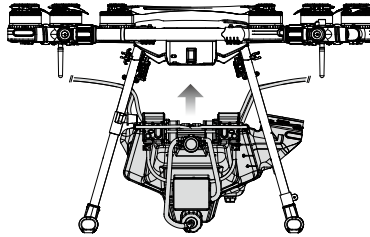


2. Prepare hose clamps B and M4×8 screws to fix the hoses to both sides on top of the spray tank.

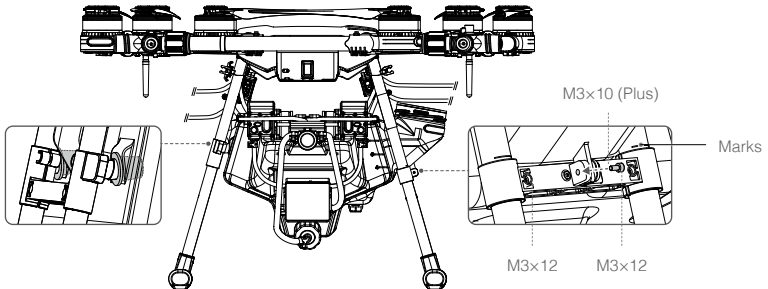
- ① Open hose clamps B to an appropriate angle gently. DO NOT over-stretch the clamps to avoid damage.
- ② Clip the clamps around a white hose (outer position) and a black hose (inner position) at positions that need to be fixed. Ensure the flat side of the clamp is close to the spray tank, then tighten the M4×8 screw.



3. Remove the cover of the spray tank. Looking from the rear of the aircraft, pull the hoses on both sides through the space between the two tubes of the landing gear leg with the mouth of the tank facing to the right side of the aircraft.
4. Lift the spray tank and pull the mouth of the tank through the space between the two tubes of the right landing gear leg.



5. Insert the plugs on the left landing gear leg into the mounting holes on the spray tank.
6. Slide the fixing part on the right landing gear leg to the marks on the tube to align the screw holes on the fixing part and the fin on the right side of the spray tank. Then tight the two M3×12 screws and one M3×10 (Plus) screw.



7. Connect each of the two pump cables to the pump port on the aircraft body.
8. Connect the radar cable to the radar port on the aircraft body.